

# Distinguished Scientist Seminar Series

10:30-12:00 p.m.

Friday, October 3, 2008

Building 50 Auditorium

## Numerical Methods for Large-Scale Experimental Design

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### Abstract

While experimental design for well-posed inverse linear problems has been well studied, covering a vast range of well-established design criteria and optimization algorithms, its ill-posed counterpart is a rather new topic. The ill-posed nature of the problem entails the incorporation of regularization techniques. The consequent nonstochastic error introduced by regularization needs to be taken into account when choosing an experimental design. We discuss different ways to define an optimal design that controls both an average total error of regularized estimates and a measure of the total cost for the design. We also introduce a numerical framework that efficiently implements such designs and natively allows for the solution of large-scale problems. To illustrate the possible applications of the methodology, we consider a borehole tomography example and a two-dimensional function recovery problem.



### Biographical Sketch

Eldad Haber is an Associate Professor in the Department of Mathematics and Computer Science at Emory University. He received his Ph.D in Geophysics and Applied Mathematics from the University of British Columbia (1997), working with Doug Oldenburg, followed by postdoctoral research in Computer Science with Uri Ascher. Since 2002, he has been on the faculty at Emory. His current research focuses on the field of scientific computing, with projects investigating computational inverse theory, computational electromagnetics, and medical image registration.

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Dr. Kevin Rosso-Nov. 7th